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ABSTRACT

The effect of training in the Cognitive Interaction Analysis System on the way teachers interact with students was studied with 15 graduate students enrolled in a college teaching course. The students represented a variety of disciplines, including agriculture, science, liberal arts, and education. Enrollees were required to teach a typical freshman level lesson during the second class session. At the end of the semester, they retaught the same lesson. Both lessons were recorded on audiotape. After teaching the first lesson, the enrollees were trained in the Cognitive Interaction Analysis System. A regular college classroom was used throughout the semester, and the program involved approximately 12 contact hours of skill training. Each participant also received a microcomputer diskette with prompting procedures on how to use the system, along with a self-instruction booklet. Analysis of variance was used to detect changes in verbal interaction between the first and second lessons. Instructors significantly increased their use of questions and corrective feedback procedures. In addition, the amount of student talk significantly increased, and the total amount of time devoted to silence significantly decreased. A marked increase in the instructor's use of positive reinforcement also occurred. (SW)

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Does Training in the Cognitive Interaction Analysis System Change Verbal Behavior ?

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Abstract

The author was interested in changing the verbal interaction of fifteen (15) teachers enrolled in a graduate course called "College Teaching." To determine if changes took place, the enrollees were required to teach a typical freshman level lesson during the second class session. At the end of the semester, they retaught the same lesson. Both lessons were audio tape recorded. After teaching the first lesson, the enrollees were trained in the Cognitive Interaction Analysis System. Analysis of variance was used to detect any changes in verbal interaction between the first and second lessons. Significant differences were detected for seven variables, and two other variables were only slightly below the .05 level of significance.

Does Training in the Cognitive Interaction Analysis System Change Verbal Behavior?

INTRODUCTION

Post-secondary students are beginning to expect quality teaching in their courses. Many times classes are taught by instructors who are completely oblivious to the process of interacting with students. The purpose of this study was to see if training in the Cognitive Interaction Analysis System would bring about any significant differences in the way teachers interact with students.

Why train teachers in the Cognitive Interaction Analysis System? According to Flanders, benefits are derived when instructors are trained in an interaction system; by learning to code with an interaction analysis system, the teacher becomes more responsive to students and becomes more flexible in teaching (Flanders, 1970, pp. 354-355).

Two empirical studies conducted at Texas A&M University provided data supporting the conclusion that students enrolled in classes of instructors receiving training in interaction analysis scored higher on achievement tests and had more positive attitudes toward the teacher than did students enrolled in courses where the instructors did not receive such training. One of the studies involved college physics classes and the other study involved calculus classes (Johnson, 1976, p.16).

Studies like those cited above provided the rational for the present effort. The author was interested in finding answers to the following questions via a one-group pretest-posttest design: (a) Using content from the instructor's discipline, what use would be made of questions, corrections, cues, positive reinforcers, and student comments? (b) After skill training in the Cognitive Interaction Analysis System, how would the instructors reteach their original lessons? (c) Would there be any significant changes in the use of questions, corrections, cues, positive reinforcers, and student comments between the pretraining lesson and the posttraining lesson?

METHOD

Subjects

Fifteen graduate students enrolled in a course called "College Teaching." They were from a variety of different disciplines; e.g., agriculture, science, liberal arts, education.

Apparatus/Materials/Training Programs

A regular college classroom was used throughout the semester. A pretraining and a posttraining lesson were audio tape recorded using a standard tape recorder. The classroom was equipped with a blackboard, eraser, chalk, podium, overhead projector and screen, and desk/chair type seating.

The program involved approximately twelve contact hours of skill training in the Cognitive Interaction Analysis System during regularly scheduled class periods. Each participant also received a microcomputer diskette with prompting procedures on how to use the Cognitive Interaction Analysis System. Each received a self-instruction booklet and an audio tape with short practice lessons to assist them in learning interaction analysis independent of the classroom setting.

The ten categories of the Cognitive Interaction Analysis Syster appear in Table 1. After skill training in interaction analysis, the instructor could record one of the ten categories in use every three seconds. The numbers could be transposed to a 10 X 10 matrix for further analysis. Different ratios and percentages could also be calculated to assist in the lesson analysis.

RESULTS

Audio tapes of the pretraining lesson and the posttraining lesson were used to collect data for analysis. The author's procedures and ground rules for his Cognitive Interaction Analysis System were used to study each individual's taped lessons. Analysis of variance was used to detect any changes in verbal behavior of the instructors. Significant differences between the pre and posttraining were noted for seven variables, and two additional variables were only slightly below the .05 level of significance. Analysis of variance data are displayed in Table 2.

Significant differences were noted for category three ($p=.0005$) when the instructors increased their use of corrective/feedback, category four ($p=.01$) when the instructors increased their use of questions, category eight ($p=.0003$) when the amount of student talk increased, and the total amount of time devoted to silence decreased ($p=.0250$). Also, total pupil talk (PT) increased significantly ($p=.0001$), the instructors increased the number of questions (Q) they asked the students ($p=.0101$), and the instructors increased the number of different times they provided corrective/feedback (CF) to the students ($p=.0001$). Not quite reaching a .05 level of significance, but showing a marked increase after training, were category 2 positive reinforcement ($p=.0556$) and the total number of different times the instructors used positive reinforcers (R) with the students ($p=.0681$).

DISCUSSION

The level of significance between pretraining and posttraining lessons revealed striking differences. Those involved in the study made marked changes in their verbal behavior. They appeared to become more aware of the learners they were teaching, and they certainly increased their use of questions, corrective/feedback procedures, and positive reinforcers. Personnel involved in faculty development efforts may wish to use the Cognitive Interaction Analysis System to enhance the flexibility of instructors working in their post-secondary settings.

Notes

1. Johnson's Cognitive Interaction Analysis System (CIAS) and a training program in CIAS are available on microcomputer diskette. Both are included in College Teaching - Parts I and II. College Teaching - Parts I and II has six modules on two 5¼" diskettes, available only for the IBM-PC, on double sided diskettes. Information can be obtained by writing: College Teaching, P. O. Box 13255, College Station, Texas 77841.

2. Ned A. Flanders, Analyzing Teaching Behavior, Reading, Mass.: Addision-Wesley Publishing Company, 1970.

3. Glenn R. Johnson, Analyzing College Teaching, Manchaca, Texas: Sterling Swift Publishing Co., 1976.

Table 1 - *Cognitive Interaction Analysis System (CIAS)

(*No rating scale is implied; the numerals merely indicate the particular category of interaction in use during each 3 seconds)

TEACHER TALK (1-7)	1.	Accepting student attitudes. Comments that communicate a nonthreatening acceptance of student attitudes; student attitudes may be positive or negative; "You appear to be upset about this." "I'm glad to see all are happy about the results from last week's test."
	2.	Positive reinforcement. Praising students; communicating a definite value judgment indicating that the instructor really likes what the student said or did; "Excellent!" "Very good!"
	3.	Corrective/feedback. Includes negative statements which are non-punitive and nonthreatening; saying "no" or "yes" or "that's correct" in a manner that provides feedback to students; repeating a student's response so all students know the answer was correct or acceptable.
	4.	Questions. Includes rhetorical questions; all questions raised by the teacher; calling on student by name to respond to a question.
	5.	Lecture. Communicating facts, expressing ideas, giving examples.
	6.	Providing cues/directions. Words that signal importance; "This is important to remember." "These next four items are very important in our study." Directions the instructor expects the students to follow; includes procedural directions.
	7.	Criticism. Negative, punitive comments; strong criticism; blaming students; saying "Ridiculous" or "That's silly" or "Don't interrupt me when I'm giving my lecture."
STUDENT TALK (8-9)	8.	Cognitive student talk. Talk by students which are subject matter oriented; recalling facts; responding to teacher questions or directions with subject matter responses or subject matter questions; expressing opinions or ideas about topics under study; analyzing, synthesizing, evaluation; subject-matter questions raised by students.
	9.	Non-cognitive student talk. Talk by students which is not related to subject matter; management comments by students; "Can we leave now?" or "Will we have the quiz tomorrow?" or "I went to the game Saturday and didn't have time to prepare my lesson."
	10.	Silence. Three seconds or more of silence; pauses, when no communication exists.

Table 2 - Analysis of Variance

Tallies for Category 1 - Accepting Student Attitudes (Teacher Talk)

	DF	MS	F	p
Between	1	313.6	3.32	.0758
Within	28	94.5		
Total	29			

Tallies for Category 2 - Positive Reinforcement (Teacher Talk)

	DF	MS	F	p
Between	1	48.13	3.89	.0556
Within	28	12.38		
Total	29			

Tallies for Category 3 - Corrective/Feedback (Teacher Talk)

	DF	MS	F	p
Between	1	418.13	9.36	.00005
Within	28	44.68		
Total	29			

Tallies for Category 4 - Questions (Teacher Talk)

	DF	MS	F	p
Between	1	842.7	7.35	.01
Within	28	114.6		
Total	29			

Tallies for Category 5 - Lecture (Teacher Talk)

	DF	MS	F	p
Between	1	4106.70	2.36	.1325
Within	28	1743.24		
Total	29			

Tallies for Category 6 - Providing Cues/Directions (Teacher Talk)

	DF	MS	F	p
Between	1	472.03	2.49	.1222
Within	28	189.50		
Total	29			

Table 2 - Analysis of Variance (continued)

Tallies for Category 7 - Criticism (Teacher Talk)

	DF	MS	F	p
Between	1	0.0	0.0	1.0
Within	28	0.067		
Total	29			

Tallies for Category 8 - Cognitive Student Talk

	DF	MS	F	p
Between	1	1512.30	18.79	.00003
Within	28	80.47		
Total	29			

Tallies for Category 9 - Non-Cognitive Student Talk

	DF	MS	F	p
Between	1	0.83	2.50	.1215
Within	28	0.33		
Total	29			

Tallies for Category 10 - Silence

	DF	MS	F	p
Between	1	313.6	3.32	.0758
Within	28	94.5		
Total	29			

Ratio for SC - Calculated by dividing the number of tallies in category ten by the total number of tallies for all ten categories

	DF	MS	F	p
Between	1	99.00	5.48	.0250
Within	28	18.06		
Total	29			

Ratio for TT - Calculated by dividing the total tallies in categories one through seven by the total number of tallies for all ten categories.

	DF	MS	F	P
Between	1	97.92	2.52	.1204
Within	28	38.94		
Total	29			

Ratio for PT - Calculated by dividing the total tallies in categories eight and nine by the total number of tallies for all ten categories.

	DF	MS	F	P
Between	1	396.76	24.17	.00001
Within	28	16.41		
Total	29			

Ratio for PTC - Calculated by dividing the total tallies in category eight by the total tallies in categories eight plus nine.

	DF	MS	F	P
Between	1	0.10	1.58	.2174
Within	28	0.06		
Total	29			

Q - Indicates the number of <u>different times</u> the teacher asked questions.

	DF	MS	F	P
Between	1	425.63	7.54	.0101
Within	28	56.50		
Total	29			

CF - Indicates the number of different times the teacher provided corrective/feedback.

	DF	MS	F	P
Between	1	360.53	15.05	.00009
Within	28	23.95		
Total	29			

R - Indicates the number of different times the teacher used positive reinforcement.

	DF	MS	F	p
Between	1	36.30	3.515	.0681
Within	28	10.33		
Total	29			